DOCUMENT RESUME

ED 417 080 SE 061 198

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TITLE The Effects of Relaxation and Visualization on Information Retention in Fifth Grade Science Students.
PUB DATE 1997-05-00
NOTE 46p.
PUB TYPE Reports - Research (143)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Academic Achievement; Concept Formation; Educational Strategies; Grade 5; Intermediate Grades; *Learning Strategies; *Relaxation Training; *Science Education; *Study Skills; *Visualization

ABSTRACT

This paper examines the effectiveness and feasibility of introducing relaxation and visualization techniques as study skills. Fifth grade science students from Charlottesville, Virginia (N=43) received six 20-minute classes using relaxation to study information on famous scientists. Results of this study indicate that relaxation and visualization can be used as a regular classroom activity and will enhance student achievement by reducing stress, increasing attention span, and helping students learn more effectively. Findings also suggest that relaxation and visualization are effective study techniques and should be incorporated into teacher training programs. Transcript excerpts of lesson plans are provided in Appendix A. Appendix B contains relaxation exercises. Appendix C contains several biographies of important scientists. Appendix D provides the actual Creative Study skills assessment test. Appendix E calculates the number of correct responses for each question. Appendix F lists several comments by the students on their response to the program. (Contains 18 references.) (DDR)

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Running head: EFFECT OF RELAXATION AND VISUALIZATION

The Effects of Relaxation and Visualization on Information Retention in Fifth Grade Science Students

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Abstract

This project studies the effectiveness and feasibility of introducing relaxation and visualization techniques, as a study skill. Forty three fifth grade science students from Charlottesville, Virginia participated in the study. The group received six, 20 minute classes using relaxation to study information about famous scientists. While the importance of relaxation and visualization in the classroom is relatively under developed, this study shows that relaxation and visualization can be used as a regular classroom activity and will enhance student achievement by reducing stress, increasing attention span, and helping students learn more effectively. The finding from this study suggest that relaxation and visualization are effective study techniques. Further, the study recommends that relaxation and visualization techniques be incorporated in teacher training programs.

The Effects of Relaxation and Visualization on Information Retention in Fifth Grade Science Students

As teachers, we are continually challenged to become more efficient and to develop more effective ways to impact our students and increase their learning potential. In these days of cutbacks coupled with an increase in the number of needy children, we have to learn better ways to help students learn, improve their self esteem and develop social skills. With the impact of daily stresses on their lives, more information to absorb, and increasingly rigorous standards facing today's student, any study skill that can enhance their learning potential needs to be explored and implemented.

Believing that mental relaxation and visualization can increase student effectiveness is the hypothesis of this study. The focus of educational practices today is centered on Bloom's taxonomy of the three domains: cognitive, affective, and psychomotor. This encourages the practice of the objective teaching modes vs. the subjective. However, with a renewed emphasis on basic skills, students need even more tools to master facts and become creative problem solvers. While relaxation and visualization techniques that can help the learner develop effective study skills and increase concentration to be more effective problem solvers are available, implementing them in the classrooms has not been widespread. This study will show how easy and effective it is to incorporate relaxation and visualization as study skills.

Historically, visualization has been used to enhance memory since about 500 B.C. It has been incorporated in a few school areas and many studies have continually found its effectiveness. This study will help to endorse the place relaxation and visualization have in today's classroom. It will help affirm that students can become more effective learners with the study skills of relaxation and visualization.

Background

Visualization, as a key to enhancing memory, has recorded uses dating to 500 B.C. The Greeks had a mnemonic image system used by orators. Cicero credited the Greeks with

discovering that images arranged orderly enhanced memory. Later, in the thirteenth century, Thomas Aquinas and his teacher Albertus Magnus used visual mnemonics that were adopted by the Dominican Order as a means to remember their sermons. By the beginning of the scientific revolution, with an increasing emphasis on rational thought, visualization lost credibility as a thinking skill. Throughout the Industrial Age the reform of education emphasized verbal transmission of information, linear styles of cognitive processing, and logical categorization. Little was attributed to mental image functions (Curtin, 1988). By the 1950's, memory enhancing programs began to gain acceptance and some began incorporating mental imagery or visualization.

Beginning in 1970 with the Symposium on Imagery in Children's Learning (Reese, H.W., 1970), there has been a renewed emphasis in studying visualization and learning. Psychology has been increasingly using visualization and this too has influenced educators to test the use of visualization in education. Visualization is used in concert with relaxation when introduced to the classroom, according to Galyean (1983). "The human brain functions more effectively and at a higher level when stress is reduced" (cited in Galyean, 1980). She indicated the many uses for visualization in the classroom. Teachers use visualization to help students relax, center and sharpen their perception, retain information, improve psychomotor skills and increase their self-esteem. Galyean also identifies visualization in three categories.

1. Guided Cognitive Imagery is defined as the imagery teachers induce when they have students close their eyes to visualize a shape in their mind that they have just studied. Another application of this type of visualization is having students take an imaginary walk through a country they are studying. This type of visualization can also be used to have students mentally practice a task before physically taking on the challenge. An example is when students are shown a task, like printing letters. After they see the teacher print the letter they copy the steps in the air. Then, they close their eyes, imagine the perfect letter and again trace it in the air. Only after all the imaginary practice are they given real pencils or crayons. "Students taught via cognitive imagery processes merged with other affective procedures tend to score significantly higher on measures

of cognitive evaluation for oral and written skills" (Galyean 1980, 1981, 1982 cited in Galyean 1983).

2. Guided Affective Imagery is an imagery that guides the student to positive thoughts of themselves. The assumptions of self-fulfilling prophecies have been documented in brain/mind research. Affective imagery helps students develop healthy self-concepts by providing them with images of their successes. An example of this type of imagery would be having students visualize a friendly conversation with an adversary. Students could also be guided to visualize a desired test score or level of proficiency at a task. "When an image of success is imprinted in the limbic brain, the person's actions will follow positive directions. (Maclean, 1978; Gray and LaViolette, 1982 cited in Galyean, 1983)

3. Guided Transpersonal Imagery is used with students to enhance their creativity in creative writing, art or drama classes. This imagery stimulates a student's interpersonal consciousness. In this type of imagery the teacher might have the students imagine their feelings as they were standing in a dark, damp forest, on a cool, moon-lit beach or in a warm breezy field. This type of imagery seems to expand the student's intellectual capabilities by increasing creativity.

Many studies during the past twenty five years can attest to the effectiveness of relaxation and visualization in the classroom. Galyean (1980) found decreases in disruptive behavior among high school students and increases in vocabulary scores of high school remedial English students when using visualization and relaxation activities. Toomin (1982 cited in Curtin, 1988) found relaxation and visualization techniques with elementary school students helped them perform better on tests and in handwriting skills. He further achieved positive results with disabled students who improved reading recognition, comprehension, and spelling when using relaxation and visualization exercises. Another study surveyed fifty educators in Los Angeles schools who observed the effects of relaxation and visualization in their classrooms (Galyean 1981). The educators noted increased attention of the students, more work being completed in class, better cooperation in class, and improved performance on tests by the students.

Visualization is also linked with increased creativity in many studies. For example, Rose and Lin (1984) observed increased creativity in skill and innate ability through relaxation and visualization. An increase in creative ability is also attributed to an emphasis on creative problem solving that has been introduced to the curriculum over the past twenty years.

Relaxation is necessary to help reduce stress that is common to the learning environment. Whitman (1987) studied stress in college students. Whitman concluded that student learning was indeed affected by stress and noted ways to help alleviate the stress. While his report involved college students, the findings were by no means exclusive to college students. Acknowledging that teachers and students share the responsibility for student learning is fundamental to all education.

Realizing that both too much and too little stress inhibit learning is also essential to the learning environment. Having a sense of being in control of the environment is important to relieving stress. Whitman found that helping students identify stress and develop effective stress reduction techniques was an important role of today's educator. Helping students improve their study skills with relaxation and visualization techniques is an effective strategy to helping students cope with stress.

Relaxation and visualization have been used as an effective technique in dealing with resistant students. Tozeland's research (1995) shows how matching breathing with a student can lead to relaxation. Once relaxed, the student is more open to communication. Communicating with the student through the use of a visualized scenario helps the student apply results to their own environment.

Students with attention deficit disorder (ADD) are also seen as achievers with relaxation techniques. Teachers who deal with ADD children need to work on improving children's attention skills among other things. Further research indicates that self-esteem and social skills also need improvement. Since attention is an important prerequisite for all learning and success in school, students need to learn to listen and be helped to have as few distractions as possible. Relaxation is noted by Scott (1987) as an important tool in dealing with ADD students. Peace, Harmony,

Awareness --A Relaxation Program for Children by Lupin (1970, cited in Scott, 1987), is a recommended source by the American Pediatric Association for teachers in dealing with ADD students.

Currently, work with learning disabled (LD) students indicates that reducing stress levels of the learning disabled significantly improves their reading, arithmetic, spelling and handwriting. Students who are ADD are at high risk for developing stress-related problems which would interfere with learning. Stress management has been effective in improving attention skills of children with ADD (Rubenzer, 1988). Rubenzer notes that treating stress in students today will help to relax our society of the future. The American Psychiatric Association reported in 1980 that stress-related mental disorders were the most treated mental illness by 200 to 400%. Many situations in schools can create or enhance student stress. A surprise test, arguing with the teacher, achievement stress, school tasks are all possible distresses that can impair school performance. However, stress management programs in the schools are almost nonexistent.

Besides achievement demands experienced by all students, learning disabled children may be at particular risk for achievement stress due to frustration stemming from the insensitivity of those who treat these children as if they choose not to perform, when in fact they cannot perform. These students also face severe doubts in self-concept as they perceive their weakness in relation to their classmates. Social rejection and fear of drawing attention to themselves magnify stress for LD students. Rubenzer (1987) recommends a whole child approach to the LD child which emphasizes the importance of relaxation and visualization. He suggests Cognitive Imagery by having children repeat such phrases as "I can do it," "I am calm and I can remember the right answers," "I have studied hard so I will do well." Rubenzer (1988) also recommends relaxation training exercises of three 10- to 15-minute sessions per week. He also recommends a relaxation center be set up in a classroom.

Specific studies attesting to the effectiveness of visualization and relaxation are numerous. In 1988 Curtin found that the keyboarding success of third graders in Eugene, Oregon was significantly enhanced with relaxation and visualization training in concert with keyboarding

practice. Her experimental group significantly outperformed the control group in key recognition and in both speed and accuracy of 1-minute and 5-minute timings.

A study of stress management in a third grade classroom (Hutchison, 1983) proved that a relaxation program for stress management is both feasible and effective when taught by the classroom teacher in a regular classroom, assuming a teacher who is convinced of the importance of the program and who is willing to allow adequate class time for the learning, maintenance, and reinforcement of the skills.

The importance of relaxation and guided imagery as regular classroom activities was studied by Ragle in 1984. Studying relaxation on a group of 58 sixth graders, she found that regular relaxation activities enhanced students behavior in the classroom and increased their creativity in language arts activities.

Besides the relevant data that supports the use of visualization in the classroom, books abound in the teaching and application of relaxation and visualization. Accelerated learning: The use of suggestion in the classroom (Prichard & Taylor, 1980) is a method that uses "relaxation, advertising-like suggestions, dramatic presentation of classroom material with students generating imagery to learn..." Mindsight (Galyean, 1983) offers many learning through imagery exercises for use in the classroom. A Tapestry of Whole-Brain Learning Strategies for Teachers (Oberg, Ellison, Feidt, Lien & Walker, 1986) was developed by the Minnesota Council on Quality Education and offers a variety of activities from self-awareness exercises to creative problem solving activities all with a heavy emphasis on relaxation and visualization. Optimizing Learning (Clark, 1986) offers relaxation and tension reduction techniques to optimize the learning environment. Creative Study Skills (Sheets & Curtin, 1989) is a program of relaxation and visualization exercises designed to improve academic achievement by reducing stress. Other goals of the program included improving student concentration and increasing attention spans.

Purpose and Rational

With evidence that relaxation affects our brain functioning, and more than 150 dissertations in the last three years alone indicating that relaxation is beneficial in many areas of

the classroom, there is still a lack of use of relaxation in classrooms. Having personally studied relaxation and imagery techniques and having used the techniques with my two teenage sons since they were pre-school age, this researcher believed in the effectiveness of relaxation in learning. The accumulation of evidence has not resulted in increased use in the classroom. Discussions with several teachers and educators revealed three reasons why relaxation and imagery may not be widely used.

1. Common misunderstanding of visualization. Many people identify visualization with the third and least commonly used imagery in education - the transpersonal imagery. Because many of these activities in the past have caused students to surface feelings of a spiritual nature, many teachers are leery of introducing into their classrooms, anything that could be interpreted as a religious experience.

2. Fundamentalist view of idleness. Conversely, some religious groups feel an idle mind is the workplace of the devil. There is a risk of offending those who believe relaxation is emptying the student's minds.

3. Inactivity. Many teachers believe that with an emphasis on making the classroom an interesting and stimulating environment, something needs to be happening all the time. Even as educators are looked to more as facilitators, it seems the idea is the facilitators need to be leading an activity more active than relaxing in the classroom.

The purpose of this study is to confirm that relaxation and visualization techniques are beneficial learning tools and enhance student performance. This study will also show the feasibility of introducing relaxation in the classroom. The feasibility will include teacher evaluation of the activities, student learning, and student perception of the activities.

Method

Participants

The subjects of this study were forty three fifth grade science students in two existing classes at an elementary school in Charlottesville, Virginia. Contact was made with a University of

Virginia Clinical Advisor who was familiar with the advantages of positive mental pictures on student performance. The two classes of students represent a diversity in socioeconomic backgrounds and achievement levels. Three of the students were identified attention deficit and were on medication. An additional four students received special education services. Eleven of the students were in the school's Quest program, a program for the gifted. Of the students, 25 were female and 18 were male. While the students represented two separate classes there was no difference in the material presented to each group. Activities were identical and results between the groups were insignificant, therefore all references are made to the students as one group for this study.

Materials

The Lesson Plans (Appendix A) were designed to teach students about the contributions of minority scientists and inventors, at the request of the Clinical Instructor. The relaxation and visualization exercises (Appendix B) were adapted with permission from the copyrighted material in Creative Study Skills (Sheets & Curtin, 1989) a teachers manual for graduates of the Silva Method of Mind Development, Stress Control. The biographies of the scientists and inventors (Appendix C) were compiled from information in encyclopedias (Grollier, 1995) and classroom resources (The Education Center, 1991). The Creative Study Skills Assessment (Appendix D) was created to evaluate student retention and acceptance of the activities. Besides pencils used by the students to answer the assessment questions, there were no other materials. The students only worked with the materials during the classes.

Procedure

The relaxation and imagery exercises from Creative Study Skills were used during six, separate, twenty minute lessons created on African American scientists and inventors. The information the students received on the scientists was only given during these 20 minute lessons. There was no homework and no other mention of this topic during the three weeks I worked with

the class. Some of the students had read or were reading biographies of some of the lesson subjects.

Since I had previously taught these students, there was little time devoted to getting to know the class. The Clinical Instructor had told the students I would be coming in to work with them on a project. The students were in two separate classes. The first class was presented their information at the end of their two hours in Science, from 9:25am to 9:45am each day. The second class received their instruction at the beginning of their Science class, 10am to 10:20am., each of the six days. Both classes received the same information and reviews since the lessons and exercises were all prepared and read to the groups.

The classes were dispersed throughout a three week period. This arrangement was at the convenience of the Clinical Instructor. Since one of the objectives of the study was to see how easily the relaxation exercises could be incorporated into the classroom, it was important that the relaxation classes be done at the convenience of the classroom teacher, rather than as an interruption. Table 1 identifies with an X, the days of the study and their dispersion throughout a three week period. The assessment day is represented by A.

Table 1

Schedule of Relaxation Classes

S	M	T	W	T	F	S
			X		X	
	X		X			
	X		X		A	

The six lessons were presented over a three week period and on the seventh visit to the school an assessment was presented.

During the first class instruction, I explained to the students that I was doing a study on the effects of a particular study skill. I explained to them the schedule for the lessons and briefly what the lessons would be about. I mentioned that each lesson started with a relaxation exercise

followed by study of information about famous scientists. The class was told that during the seventh class visit I would find out how the study skills had worked by giving them an assessment, gathering their opinions, and having them evaluate the study skills. I told them their ideas were an important part of the study.

The Clinical Instructor was also present during the classes and she made observations as to the on task behaviors and involvement of the students in the classes.

The first lesson, (Appendix A) began with the students being led through a relaxation exercise, (Appendix B). When that relaxation was completed, an information sheet on a specific scientist or inventor, (Appendix C) was passed out. The students were asked to place the sheet in front of them, face down, until told to do otherwise. After the sheets were in front of them, the students were led in another relaxation technique. During this relaxation, the students were asked to put their first and second fingers together with their thumbs, open their eyes, turn over the sheet in front of them and read along with me as I read the information on the specific scientist or inventor. After the information was read the students turned their sheets over, closed their eyes and completed the three-finger relaxation exercise. This was the end of the lesson. All information sheets were collected and the students returned to another topic. There was no homework, no notes taken on the information or any other mention of the information during the rest of their Science class.

Subsequent lessons began with the students placing their three fingers together and participating in a review of the previous lesson. Particular points or questions were asked during the review if the students missed a key point. Using probes was seldom necessary. Many times the students recalled the information almost word for word. After the review, the lessons continued as the first. Relaxation exercises were varied only for a variety. During each subsequent lesson a new scientist was introduced. Each lesson only reviewed the scientist from the previous lesson, not a compilation of all information. At no time was a comprehensive review conducted or planned.

The lesson on the seventh day began with a review of the material from the previous lesson. The students were then led through Relaxation Exercise #1. After the relaxation exercise

the students were told the assessment was going to be passed out. They were told to go through the test one time and only answer the questions they thought they knew for sure. They were encouraged, after the first time going through the assessment, to put their three fingers together and go back to the questions they were unsure of. The students were then given the assessment, (Appendix D). The assessment was read to those students who requested it as the study was to determine how much they really remembered, not how well they could read.

Results

Data were collected to assess the relationship between classroom use of relaxation and visualization with fifth grade students and their retention of information. A variety of data were collected. The scores from the students which measure the student retention of information was one portion of the result material. Additionally, information was gathered in the assessment which indicated whether individual students used the relaxation during the lessons. This information was used to compare results of students who used the relaxation and those who didn't. A t-test was used to compare the differences in these scores. Also, the students gave their own impressions and feelings about the relaxation. Finally, clinical instructor observations were gathered to judge the student involvement or on-task behavior during the lessons.

Assessment Scores

Of the 43 students, the average score was 74% on the eighteen questions that tested retention. The median score of the student body was 77%. Student test results, by question, are recorded in Table 2, (Appendix E).

Comparison of Scores

Comparisons were made between the scores of the students who reported always going to level and those who reported only going to level sometimes or never, as well as between the

scores of the students who reported always trying to go to level and those who admitted to sometimes or never even trying the exercise. An alpha level of .01 was used for all statistical tests.

Students who reported always going to level averaged 78% on the assessment. Students who reported sometimes or never going to level averaged 72% on the assessment. A t-score of 2.83 reveled a statistical difference between the groups' scores at the .01 level. An even more significant difference was noted comparing the scores of the students who always tried to those who sometimes or never tried the exercise. The students who always tried averaged 77%. Those who sometimes or never tried averaged 64% on the assessment. A t-score of 6.1 reveled a statistical difference at the .01level.

Student Impressions

Of the 43 students, 41 made positive comments about the relaxation. The impressions fell into two main categories. Many students noted their ability to remember better while the others noted their ability to study the information had been improved. All student comments are reprinted in Appendix F.

Clinical Instructor Observations

The Clinical Instructor randomly observed the classes. Her observations consistently noted that the students all seemed involved and were participating. The observations were filled with many notes of students sitting up straight, following along, participating in the reviews and generally remaining on task. In no observation did she ever note more than three different students off task. Additionally, these students, according to her observation, returned to task quickly. There were two students who were noted in more than one session as being off-task. After the first two observations, the Clinical Instructor began noting certain students who were silently wording the relaxation exercises with me.

There were interruptions from the intercom system a couple of times during the classes and the observation indicated that no more than two students ever acted as if they had been disturbed by the interruption.

In observing the review sessions, the Clinical Instructor consistently noted the students seemed to really remember the previous session with great details.

Discussion

The results culminated to strongly support the hypothesis that relaxation and visualization were both effective in the classroom and easy to incorporate.

Assessment Scores

The assessment scores indicate that while the students, on the average, retained only enough information to get a 77%, it does show how much they retained while being exposed to the information only briefly. While 77% is not a score that teachers would strive for, it is a very good score considering that learning the information was only done with the relaxation exercise. It is understood in a classroom setting that relaxation and visualization of material would be a supplemental activity to learning information rather than the sole approach to learning as in this study. There are several variables that should be introduced when evaluating the class average score.

Time

Both the amount of time the students were exposed to the information and the extended length of the study (three weeks) should be taken into account in evaluating the success. The students were exposed to the information for only as long as it took to read the information sheets, anywhere from two to five minutes. The only other time students had with the information was during the few minutes the information was orally reviewed at the beginning of the following session.

There was an inconsistent amount of time between lessons. Weekends as well as school holidays fell within the three weeks of the sessions. There was no attempt to space the sessions consistently as one purpose of the study was to show how easily relaxation and visualization could be incorporated into the classroom. Attempts to modify the classes to meet the needs of the study would have been counterproductive.

Some of the students didn't get the advantage of all the lessons or reviews. Absences, special services and administrative interruptions affected some of the students during the study. There were no special constraints put on interruptions to the class or individual students as teachers don't have the ability to curb interruptions.

Format of information

The number of students who missed all the questions on the third lesson warrant particular evaluation. Less than half the students correctly answered any of the three questions covered in the third lesson. While consideration could be given to the premise that this was a class in the middle of the study and that individuals are more likely to remember the beginning and end of a presentation than information in the middle, this is the singular lesson with such low performance. Even during the review session of this lesson I noticed the students had a difficult time recalling the information. After the assessment and having reviewed the results with the students, they complained that they had difficulty with those questions and had clear reasons for their lack of ability to recall effectively. Their reasons included the objectivity of the information. They noted the information appeared in a series of facts and it wasn't as 'story-like' as some of the other lessons. However, they also noted that the information in that lesson covered two scientists, not just one. Also, the students noted that since the two scientists were so similar, both African American astronauts, it was difficult to distinguish enough differences between the two of them to keep them memorable. If the questions regarding the third lesson had been omitted in the test scores there would have been an increase in the average. No attempt was made to do this however, as the study was designed to assess relaxation and visualization techniques, not the validity of the information presented.

Unexpected testing variables

It is necessary to emphasize the chaos surrounding the assessment day. The students had an unexpected, new, substitute teacher the day of the assessment. Additionally, there where two classroom observers who were strangers to the students. Finally, the students took the test immediately following a student pep assembly. Many of the students had performed in the assembly. These variables alone would make for a stressful testing environment. The relaxation techniques seemed to be helpful as none of the students complained, or displayed test anxiety under the conditions of the day. One of the classroom observers even remarked that they wished they had known to do a relaxation exercise when they were a substitute as it really calmed the students down and put them right on task.

Comparison of Scores

The comparison of scores between the groups of students who relaxed and did not were the most telling of this study.

The students who reported they were always able to get to a level of relaxation scored statistically higher (78%) than those who only sometimes or never felt as if they had relaxed (72%). It is worth mention that all 11 of the Quest students indicated they had always attained a level of relaxation. It seems from the results that even trying to do the relaxation exercises helped students nearly as much as actually feeling as if they had reached relaxation. The students who reported they always tried scored on the average 77%, only 1% lower than the students who reported always reaching a relaxed state. This would indicate that even though all students might not have thought they were relaxed, if they were really trying it they probably had reached a relaxed state. The students who said they either sometimes or never tried did statistically worse. With an average score of only 64% these students were at a definite disadvantage. Altogether, there were only eight students who only sometimes or never tried the relaxation. Only two students admitted to never trying, although they were participating physically in the lessons.

The numerical results indicate that relaxation and visualization could be a factor in increased student performance. The value of relaxation and visualization increases when coupled with student enthusiasm.

Student Response

While many studies have been conducted to establish the effectiveness of relaxation and visualization on learning, a manual and data-based search of the topic revealed no input from students. Reviewing what the students had to say about learning how to relax possibly provides a key as to how students learn. After only the second lesson, one 11 year-old girl said, "No one every taught me how to study before. This is great."

As noted earlier, all of the students who participate in the school's gifted program indicated they were able to relax each time. The comments from these students all centered on what they perceived as their increased memory. Comments like, "It helped me remember better," were common from this group. Not one of these students mentioned an increased ability to concentrate or study information.

For the remaining 32 students, the most common remarks centered on, "It helped me pay attention better" and "It helped me to study." These students were not as aware of increased memory skills as they were of increased concentration and study skills.

The difference in these remarks leads to the speculation that the students in the gifted program already have the power of concentration and study skills that the relaxation and visualization exercises give the rest of the students. Empowering students with more ability to learn seems to be a benefit realized by all the students.

Recommendations

Teachers must first be aware of new information and then learn how to use it. The subjective teaching and learning approach that relaxation and visualization brings to the classroom should be taught in teacher preparation and continuing education classes. While relaxation and

visualization techniques are not advocated by this study as a sole means of presenting information, relaxation seems to be a substantial aid in the classroom. Student behavior, learning and motivation are enhanced with relaxation and visualization exercises added to current teaching methods.

A replication of this study could be conducted with a larger sample of students. Further, a full comparison of ability between a control group and study group could be conducted. All other subject areas could be explored in further studies and different grade levels could be tested and/or compared. Increasing the amount of time devoted to teaching relaxation and visualization skills could be incorporated into future studies. Further studies could also pursue student-enacted relaxation and the effects on study skills. Research using comparative data could expand the investigation of any of the mentioned studies.

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Appendix A

First Day Lesson Plan

Creative Study Skills - Day One Lesson Plan

Relaxation Exercise #1, the 3 Finger Technique and George Washington Carver

Goal/Objective: 1 - Student will learn how to relax quickly in a relaxation mental exercise in order to be able to listen, draw conclusions, and share responses in subject-related group activities.
2 - Student will learn 3 Finger Technique for summarizing information
3 - Student will analyze historical information about George Washington Carver using the 3 Finger Technique.

Materials: Prepared information sheet on George Washington Carver
Relaxation Exercise #1
Relaxation Exercise - 3 Finger Technique

Procedures:

Introduction

Explain to the students how stress and tension can keep us from concentrating on our school work. By just closing our eyes and breathing deeply we can slow our brain rhythm to a healthy, relaxing level called level #1 or the Alpha Level. The study skills we'll be using during my six lessons will be a series of relaxation exercises to put your brains into a higher learning level.

State objectives/concept definition:

Today we will learn a way to relax. Here's what we will be doing. We will start with our breathing. Spend time inhaling and exhaling with students and encourage them to sit at their desks in a straight and comfortable position.

The first exercise we're going to do will only take a few minutes. I'll have you close your eyes and I'll count from 10 to 1 with some words to help you relax. Then, I'm going to count to 3 and ask you to picture your favorite place to relax. It could be a place in your home or in your neighborhood, or it may be a spot you were only at once but really felt relaxed there. After you visit your place to relax I'll explain about the relaxation level you're in. Then, I'll count from 1 to 5 and have you open your eyes.

Present new material:

Use Relaxation Exercise #1.

Ask for any questions once their eyes are opened again.

Guided Practice:

Explain that now that they know what a relaxed state feels like, they will be able to get there by just breathing deeply and with my count of 3, 2, 1. This time I'll have them picture the

number three and watch it flash three times, do the same with the number 2 and then with the number 1. Once they are at this relaxed state I'll have them put their three fingers together. They'll open their eyes and follow along as I read the material.

Read Relaxation Exercise - 3 Finger Technique

Read, with the students following along, the selected piece on George Washington Carver. Go back to 3 - 2- 1.

Review periodically:

We will revisit these relaxation exercises for the next couple of weeks.

Evaluation -

Today the students are evaluated on their cooperation and ability to complete the exercise. Individuals will be called upon to share ideas with the entire class.

Second Day Lesson Plan

Creative Study Skills - Day Two Lesson Plan

Relaxation Exercise #2, the 3 Finger Technique and Charles Richard Drew

Goal/Objective: 1 - Student will learn how to relax quickly in a relaxation mental exercise in order to be able to listen, draw conclusions, and share responses in subject-related group activities.
2 - Student will learn 3 Finger Technique for summarizing information
3 - Student will analyze historical information about Charles Richard Drew using the 3 Finger Technique.

Materials: Prepared information sheet on Charles Richard Drew
Relaxation Exercise #2
Relaxation Exercise - 3 Finger Technique

Procedures:

Introduction

Remind the students about the importance of relaxing to learn. Explain that we will be returning to a relaxed level to learn, we will revisit some of the things we learned about George Washington Carver and we will discuss Charles Richard Drew.

Review

Explain that now we will be putting our three fingers together to review the material we read on George Washington Carver.
As soon as the students have put three fingers together count to three and have them open their eyes for a George Washington Carver discussion. Make sure the students cover this information in their recall of information.

Does anyone remember why he is famous

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Some of the products he developed
The name of the college he taught at

State objectives/concept definition:

Today we will go back to relaxation. Here's what we will be doing. We will start again with our breathing, remember the inhaling and exhaling. Encourage them to sit at their desks in a straight and comfortable position.

The first exercise is the short one. I'll have you close your eyes and I'll count from 10 to 1 with some words to help you relax.

- Then, I'm going to count to 3 and ask you to picture your favorite place to relax.
- After you visit your place to relax I'll explain about the relaxation level you're in.
- Then, I'll count from 1 to 5 and have you open your eyes.

Present new material:

Use Relaxation Exercise #2.

Guided Practice:

Go back to 3 - 2- 1.

Read, with the students following along, the selected piece on Charles Richard Drew.
Go back to 3 - 2- 1.

Review periodically:

We will revisit these relaxation exercises for the next couple of weeks.

Evaluation -

Today the students are evaluated on their cooperation and ability to complete the exercise. Individuals will be called upon to share ideas with the class.

Third Day Lesson Plan

Creative Study Skills - Day Three Lesson Plan

Relaxation Exercise #1, the 3 Finger Technique and Astronauts Bluford and McNair

Goal/Objective: 1 - Student will learn how to relax quickly in a relaxation exercise in order to be able to listen, draw conclusions, and share responses in subject-related group activities.
2 - Student will learn 3 Finger Technique for summarizing information
3 - Student will analyze historical information about Bluford and McNair.

Materials: Prepared information sheet on Astronauts Bluford and McNair
Relaxation Exercise #1
Relaxation Exercise - 3 Finger Technique

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Procedures:

Review previous instruction

Have the students bring their three fingers together and discuss important points bout
Charles Richard Drew
He developed methods for preserving blood plasma
it helped blood transfusions
He was born in Washington, D.C.
He was denied admission to medical schools in U.S.
He was a surgeon and a scientist
He was named the first director of the American Red Cross Blood Bank
He resigned because of segregation policy for blood
He died in an automobile accident due to loss of blood

Introduction

Explain to the students how stress and tension can keep us from concentrating on our school work. By just closing our eyes and breathing deeply we can slow our brain rhythm to a healthy, relaxing level called level #1 or the Alpha Level. The study skills we'll be using today begin with a relaxation exercise.

State objectives/concept definition:

Today we will review relaxation. Here's what we will be doing. We will start with our breathing. Spend time inhaling and exhaling with students and encourage them to sit at their desks in a straight and comfortable position.

The first exercise we're going to do will only take a few minutes. I'll have you close your eyes and I'll count from 10 to 1 with some words to help you relax. Then, I'm going to count to 3 and ask you to picture your favorite place to relax. It could be a place in your home or in your neighborhood, or it may be a spot you were only at once but really felt relaxed there. After you visit your place to relax I'll explain about the relaxation level you're in. Then, I'll count from 1 to 5 and have you open your eyes.

Present new material:

Use Relaxation Exercise #1.

Ask for any questions once their eyes are opened again.

Guided Practice:

Explain that now that they know what a relaxed state feels like, they will be able to get there by just breathing deeply and with my count of 3, 2, 1. This time I'll have them picture the number three and watch it flash three times, do the same with the number 2 and then with the number 1. Once they are at this relaxed state I'll have them put their three fingers together. They'll open their eyes and follow along as I read the material.

Read Relaxation Exercise - 3 Finger Technique

Read, with the students following along, the selected piece on Astronauts Bluford and McNair.

Go back to 3 - 2- 1.

Review periodically:

We will revisit these relaxation exercises for the next couple of weeks.

Evaluation -

Today the students are evaluated on their cooperation and ability to complete the exercise. Individuals will be called upon to share ideas with the entire class.

Fourth Day Lesson Plan

Creative Study Skills - Day Four Lesson Plan

Relaxation Exercise #3, the 3 Finger Technique and Walter Eugene Massey

Goal/Objective: 1 - Student will learn how to relax quickly in a relaxation exercise in order to be able to listen, draw conclusions, and share responses in subject-related group activities.
2 - Student will learn 3 Finger Technique for summarizing information
3 - Student will analyze historical information about Walter Eugene Massey using the 3 Finger Technique.

Materials: Prepared information sheet on Walter Eugene Massey
Relaxation Exercise #3
Relaxation Exercise - 3 Finger Technique

Procedures:

Review previous instruction

Have the students bring their three fingers together and discuss important points about astronauts Guion Stewart Bluford and Ronald McNair

Bluford

He was the first Black American astronaut
He was born in Philadelphia
He graduated from Pennsylvania State
He was a fighter pilot in Vietnam with the Air Force
He was a mission specialist on the Challenger

McNair

Born in Lake City South Carolina
He was a physicist and astronaut
He was raised in S.C. and picked cotton
Attended NCU in Greensboro, N.C.
Got a Ph.D. at MIT

Did laser research before becoming an astronaut
On his first space mission he orbited the earth 122 times
Lost his life in the space shuttle Challenger explosion in 1986

Introduction

Remind the students about the importance of relaxing to learn. Explain that we will be returning to a relaxed level to learn, we will revisit some of the things we learned about the astronauts Bluford and McNair.

State objectives concept definition

Today we will learn another relaxation technique. We will be practicing the 3 to 1 technique of relaxing.

- Then, I'm going to count to 3 and ask you to picture your favorite place to relax.
- After you visit your place to relax I'll explain about the relaxation level you're in.
- Then, I'll count from 1 to 5 and have you open your eyes.

Present new material:

Use Relaxation Exercise #3.

Review with guided practice:

Explain that now we will be going back to the 3 Finger Technique and have someone review what that is.

Guided Practice:

Go to relaxation with the 3 - 2- 1 method.
Read, with the students following along, the selected piece on Walter E. Massey.
Go back to 3 - 2- 1.

Review periodically:

We will revisit these relaxation exercises two more times, next week.

Evaluation -

Today the students are evaluated on their cooperation and ability to complete the exercise. Individuals will be called upon to share ideas with the class.

Day Five Lesson Plan

Creative Study Skills - Day Five Lesson Plan

Relaxation Exercise #2, the 3 Finger Technique and Madame C.J. Walker

Goal/Objective: 1 - Student will learn how to relax quickly in a relaxation exercise in order to be able to listen, draw conclusions, and share responses in subject-related group activities.
2 - Student will learn 3 Finger Technique for summarizing information
3 - Student will analyze historical information about Madame C.J. Walker.

Materials: Prepared information sheet on Madame C.J. Walker
Relaxation Exercise #2
Relaxation Exercise - 3 Finger Technique

Procedures:

Review previous instruction

Have the students bring their three fingers together and discuss important points about Walter E. Massey

He is an African American physicist and educator
He was born in Mississippi
As a child he loved Math and Science
He studies the energy in certain liquids and solids
He was the first African American president of the American Association for the advancement of Science
At Brown College he developed a program to train science teachers

Introduction

Explain to the students how stress and tension can keep us from concentrating on our school work. By just closing our eyes and breathing deeply we can slow our brain rhythm to a healthy, relaxing level called level 1 or the Alpha Level. The study skills we'll be using today begin with a relaxation exercise.

State objectives/concept definition:

Today we will review relaxation. Here's what we will be doing. We will start with our breathing. Spend time inhaling and exhaling with students and encourage them to sit at their desks in a straight and comfortable position.

The first exercise we're going to do will only take a few minutes. I'll have you close your eyes and I'll count from 10 to 1 with some words to help you relax. Then, I'm going to count to 3 and ask you to picture your favorite place to relax. It could be a place in your home or in your neighborhood, or it may be a spot you were only at once but really felt relaxed there. After you visit your place to relax I'll explain about the relaxation level you're in. Then, I'll count from 1 to 5 and have you open your eyes.

Present new material:

Use Relaxation Exercise #2
Ask for any questions once their eyes are opened again.

Guided Practice:

Explain that now that they know what a relaxed state feels like, they will be able to get there by just breathing deeply and with my count of 3, 2, 1. This time I'll have them picture the number three and watch it flash three times, do the same with the number 2 and then with the number 1. Once they are at this relaxed state I'll have them put their three fingers together. They'll open their eyes and follow along as I read the material.

Read Relaxation Exercise - 3 Finger Technique

Read, with the students following along, the selected piece on Madame C.J. Walker.
Go back to 3 - 2- 1.

Review periodically:
We will revisit these relaxation exercises for the rest of this week.

Evaluation -
Today the students are evaluated on their cooperation and ability to complete the exercise. Individuals will be called upon to share ideas with the entire class.

Day Six Lesson Plan

Creative Study Skills - Day Six Lesson Plan

Relaxation Exercise #3, the 3 Finger Technique and Astronomer Benjamin Banneker

Goal/Objective: 1 - Student will learn how to relax quickly in a relaxation exercise in order to be able to listen, draw conclusions, and share responses in subject-related group activities.
2 - Student will learn 3 Finger Technique for summarizing information
3 - Student will analyze historical information about Benjamin Banneker using the 3 Finger Technique.

Materials: Prepared information sheet on Astronomer Benjamin Banneker
Relaxation Exercise #3
Relaxation Exercise - 3 Finger Technique

Procedures:
Review previous instruction
Have the students bring their three fingers together and discuss important points about Madame C.J. Walker

She was a female African American inventor
She was born in Louisiana
Parents died when she was 6
She took in laundry to feed herself and daughter
She discovered the Walker Method for relaxing curls
Walker products employed 3,000 people
Established Walker Schools of Beauty
First African American female millionaire

Introduction
Remind the students about the importance of relaxing to learn. Explain that we will be returning to a relaxed level to learn.

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State objectives/concept definition:

Today we will use the 3 to 1 technique of relaxing. Review it.

- Then, I'm going to count to 3 and ask you to picture your favorite place to relax.
- After you visit your place to relax I'll explain about the relaxation level you're in.
- Then, I'll count from 1 to 5 and have you open your eyes.

Present new material:

Use Relaxation Exercise #3.

Review with guided practice:

Explain that now we will be going back to the 3 Finger Technique and have someone review what that is.

Guided Practice:

Go to relaxation with the 3 - 2- 1 method.

Read, with the students following along, the selected piece on Walter E. Massey.

Go back to 3 - 2- 1.

Review periodically:

We will revisit these relaxation exercises two more times, next week.

Evaluation -

Today the students are evaluated on their cooperation and ability to complete the exercise. Individuals will be called upon to share ideas with the class.

Appendix B

Relaxation Exercise #1

(Instruct students to sit comfortably and follow directions as you read the relaxation exercise.)

Close your eyelids. With your eyelids closed, you are at a deeper level of awareness, at a lower frequency of brain rhythm.

With your eyelids closed, you can learn to function at deeper levels of awareness, at the Alpha frequency of brain waves. Breathe deeply...calmly...slowly... very much as you do when you are sleeping. Recall the way you feel just before going to sleep (short pause). Continue to breathe deeply, calmly, slowly. Feel your whole body relaxing more deeply with each breath.

To help you enter a deeper, healthier level of mind, I am going to count from 10 to 1. On each descending number you will feel yourself relaxing more and you will enter a deeper, healthier. level of mind.

10 - 9 Feel yourself going deeper
8 - 7
6 - deeper and deeper
5 - 4
3 - deeper and deeper
2 - 1 You are now at a deeper and healthier level of mind, deeper than before

You may enter a deeper, healthier level of mind by relaxing your eyelids. Smile...be conscious of your eyes turning up at the corner... Be aware of how relaxed they feel. Continue smiling and feel the relaxation in your face and throat. Allow this feeling of relaxation to flow slowly throughout your whole body...all the way to your toes (pause)

To help you mentally relax, I will count from 1 to 3. At the count of three you will pretend to be at your favorite place of relaxation. I will then be quiet while you picture your favorite place...see the colors...hear the sounds...smell the fragrances and feel your environment. When you hear my voice again you will feel as though you have had one hour of relaxing, energizing, healthy sleep. When you hear me count, you will take a deep breath, relax and enter a deeper level of mind. 1 - 2 - 3. Pretend that you are at your favorite place of relaxation. Do it now. Relax. (Pause for 1 minute.)

Relax (pause). Take a deep breath and as you exhale, relax and go deeper (pause). Whenever you hear me mention the word, "relax," you will completely relax... physically and mentally.

The difference between genius and average mentality is that geniuses use more of their minds and use them in a creative and constructive manner. You are now learning to use more of your mind and to use it in a creative, constructive manner.

In a moment, I am going to count from 1 to 5. At the count of five you will open your eyes, be wide awake, feeling alert and ready for an exciting afternoon of presentations. 1 - 2 - 3 : at five you will open your eyes, be wide awake, feeling alert and in excellent health, 4 - 5, eyes open, wide awake, feeling fine and in excellent health.

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Relaxation Exercise #2

(Instruct students to sit comfortably and follow directions as you read the relaxation exercise.)

Close your eyelids. With your eyelids closed, you are at a deeper level of awareness, at a lower frequency of brain rhythm.

With your eyelids closed, you can learn to function at deeper levels of awareness, at the Alpha frequency of brain rhythm. Breathe deeply...calmly...slowly... very much as you do when you are sleeping. Recall the way you feel just before going to sleep (short pause). Continue to breathe deeply, calmly, slowly. Feel your whole body relaxing more deeply with each breath.

To help you enter a deeper, healthier level of mind, I am going to count from 10 to 1. On each descending number you will feel yourself relaxing more and you will enter a deeper, healthier. level of mind.

10 - 9 Feel yourself going deeper
8 - 7
6 - deeper and deeper
5 - 4
3 - deeper and deeper
2 - 1 You are now at a deeper and healthier level of mind, deeper than before

You may enter a deeper, healthier level of mind by relaxing your eyelids. Smile...be conscious of your eyes turning up at the corner... Be aware of how relaxed they feel. Continue smiling and feel the relaxation in your face and throat. Allow this feeling of relaxation to flow slowly throughout your whole body...all the way to your toes (pause)

To help you mentally relax, I will count from 1 to 3. At the count of three you will pretend to be at your favorite place of relaxation. I will then be quiet while you picture your favorite place...see the colors...hear the sounds...smell the fragrances and feel your environment. When you hear my voice again you will feel as though you have had one hour of relaxing, energizing, healthy sleep. When you hear me count, you will take a deep breath, relax and enter a deeper level of mind. 1 - 2 - 3. Pretend that you are at your favorite place of relaxation. Do it now. Relax. (Pause for 1 minute.)

Relax (pause). Take a deep breath and as you exhale, relax and go deeper (pause). Whenever you hear me mention the word, "relax," you will completely relax... physically and mentally.

The difference between genius and average mentality is that geniuses use more of their minds and use them in a creative and constructive manner. You are now learning to use more of your mind and to use it in a creative, constructive manner.

The following statements are for your benefit and better health:

- **Everyday in every way I am getting better and better**
- **I will always be in control and will feel good about my ability to say NO to drugs, alcohol, nicotine and all other destructive chemicals**
- **I will always maintain a healthy body and mind**
- **At all times, I have full control of my mind**
- **Positive thought bring me benefits and advantages I desire**

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- I enjoy being in school everyday
- I enjoys turning in completed homework assignments
- I am a wonderful students

In a moment, I am going to count from 1 to 5. At the count of five you will open your eyes, be wide awake, feeling alert and ready for an exciting afternoon of presentations. 1 - 2 - 3 : at five you will open your eyes, be wide awake, feeling alert and in excellent health, 4 - 5, eyes open, wide awake, feeling fine and in excellent health.

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Relaxation Exercise #3

(Instruct students to sit comfortably and follow directions as you read the relaxation exercise.)

We will start this exercise with the 3 to 1 method. Find a comfortable position; close your eyelids, take a deep breath and while exhaling, mentally repeat and visualize the number 3, three times.

Take another deep breath and while exhaling, mentally repeat and visualize the number 2, three times.

Take another deep breath and while exhaling, mentally repeat and visualize the number 1, three times.

You are now at level 1, the basic plane level that you can use for any creative, constructive purpose you desire.

To help you enter a deeper, healthier level of mind, I am going to count from 10 to 1. On each descending number you will feel yourself relaxing more and you will enter a deeper, healthier. level of mind.

10 - 9	Feel yourself going deeper
8 - 7	
6 -	deeper and deeper
5 - 4	
3 -	deeper and deeper
2 - 1	You are now at a deeper and healthier level of mind, deeper than before

You may enter a deeper, healthier level of mind by relaxing your eyelids. Smile...be conscious of your eyes turning up at the corner... Be aware of how relaxed they feel. Continue smiling and feel the relaxation in your face and throat. Allow this feeling of relaxation to flow slowly throughout your whole body...all the way to your toes (pause)

To help you mentally relax, I will count from 1 to 3. At the count of three you will pretend to be at your favorite place of relaxation. I will then be quiet while you picture your favorite place...see the colors...hear the sounds...smell the fragrances and feel your environment. When you hear my voice again you will feel as though you have had one hour of relaxing, energizing, healthy sleep. When you hear me count, you will take a deep

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breath, relax and enter a deeper level of mind. 1 - 2 - 3. Pretend that you are at your favorite place of relaxation. Do it now. Relax. (Pause for 1 minute.)

Relax (pause). Take a deep breath and as you exhale, relax and go deeper (pause). Whenever you hear me mention the word, "relax," you will completely relax... physically and mentally.

The difference between genius and average mentality is that geniuses use more of their minds and use them in a creative and constructive manner. You are now learning to use more of your mind and to use it in a creative, constructive manner.

The following statements are for your benefit and better health:

- **Everyday in every way I am getting better and better**
- **I will always be in control and will feel good about my ability to say NO to drugs, alcohol, nicotine and all other destructive chemicals**
- **I will always be in control and feel good about making choices that are creative and constructive.**
- **I will always maintain a healthy body and mind**
- **At all times, I have full control of my mind**
- **Positive thought bring me benefits and advantages I desire**
    - **I enjoy being in school everyday**
    - **I enjoys turning in completed homework assignments**
    - **I am a wonderful students**

In a moment, I am going to count from 1 to 5. At the count of five you will open your eyes, be wide awake, feeling alert and ready for an exciting afternoon of presentations. 1 - 2 - 3 : at five you will open your eyes, be wide awake, feeling alert and in excellent health, 4 - 5, eyes open, wide awake, feeling fine and in excellent health.

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Three Finger Relaxation Exercise

(Instruct students to sit comfortably and follow directions as you read the relaxation exercise.)

We will start this exercise with the 3 to 1 method. Find a comfortable position; close your eyelids, take a deep breath and while exhaling, mentally repeat and visualize the number 3, three times.

Take another deep breath and while exhaling, mentally repeat and visualize the number 2, three times.

Take another deep breath and while exhaling, mentally repeat and visualize the number 1, three times.

You are now at level 1, the basic plane level that you can use for any creative, constructive purpose you desire.

At this time, bring together the tips of the first two fingers and thumb of either hand. By bringing your three fingers together, your mind adjusts to a greater level of awareness for better learning. Better learning of information results in easier recall,

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producing a better memory. I will soon count from 1 to 3. At the count of 3, you will open your eyes, turn over the paper in front of you and follow along as I read the information on the scientist of the day. Noises will not distract you. You will focus your thoughts for superior concentration.

At the count of three, you will open your eyes and be mentally alert while reading.

1 - 2 - 3 Open your eyes, turn the sheet over and follow along while I read.

(Read the lesson of the day)

Close your eyes, take a deep breath and relax (pause). Take a deep breath and as you exhale, relax.

The difference between genius and average mentality is that geniuses use more of their minds and use them in a creative and constructive manner. You are now learning to use more of your mind and to use it in a creative, constructive manner.

You will recall the lesson you have just read at any time in the future with the use of the three finger technique.

Next time we will discuss the accomplishments of the scientist we just read about. You will enjoy sharing your ideas and listening to the ideas of others.

Remember, every time you study in a relaxed state, your ability to control your thoughts and your learning increases. You find you are more confident and aware of your increased learning potential.

In a moment, I will count from 1 to 3. At the count of three you will open your eyes, feeling relaxed, alert and ready for a wonderful rest of the day.

1 - 2 - 3

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Appendix C

Biography #1 George Washington Carver

George Washington Carver

George Washington Carver was a black American botanist and chemist who helped bring prosperity to large areas of the impoverished southern United States. He was born a slave on a Missouri farm. The exact date he was born is unknown, but it was about July 12, 1861. He was orphaned as an infant and freed at the end of the Civil War. He spent his early years in the household of his former owner, Moss Carver whose name he adopted. Carver went to school in a one-room school for blacks. In 1889 he went to Simpson College in Iowa and earned the $12 yearly tuition as a cook. Carver had great talent as an artist but decided to study horticulture. He earned his master's degree at Iowa State Agricultural College in 1896. Upon graduation, Carver was appointed by Booker T. Washington to head the newly formed Department of Agriculture at Tuskegee Institute in Alabama. Carver spent the rest of his life at Tuskegee pursuing research. As a result of overgrowing cotton and tobacco in the South, much of the farming land had been depleted. Carver experimented with nitrogen-producing legumes and found that peanuts and sweet potatoes both improved the soil and grew in the South. He further developed more than three hundred products using these crops. Cereals, soaps, dyes and food substitutes are a few examples of the many uses Carver found for peanuts and sweet potatoes.

Additionally, he began his notable School on Wheels, a traveling classroom that taught Alabama farmers the basics of soil enrichment. His fame as a scientist and educator grew throughout the world, and when he died in Tuskegee in 1943, he was one of America's most honored scientists.

Biography #2 Charles Richard Drew

Charles Richard Drew

Charles Richard Drew was born in Washington, D.C. on June 3, 1904. Drew developed methods for preserving blood plasma for transfusion. He was an African American surgeon and scientist, originally denied admission to medical schools in the U.S. He was accepted to Canada's McGill

University in Montreal where he received his M.D. and Master of Surgery degrees in 1933. While an intern at Montreal General, he studied the unsolved problem of blood preservation.

In 1935, Drew joined the faculty at the College of Medicine at Howard University and became a research fellow at New York's Columbia-Presbyterian Medical Center. There, he established and directed a hospital blood bank that became the model for the American Red Cross blood-bank network. He developed a method for preserving blood plasma so it could be collected and stored for transfusions. Drew earned a Doctor of Medical Science degree from Columbia University in 1940.

Drew accepted an offer to direct the "Blood for Britain" project during World War II. He turned down an offer to direct the first American Red Cross blood bank in New York after learning he was to enforce a policy requiring blood to be segregated by race. He protested the scientific absurdity of the rule. After the war, Drew resumed his duty as the chair of surgery at Howard University.

Drew died on April 1, 1950. He had been in an automobile accident and died from excessive loss of blood after being refused admittance to a whites-only hospital in the South.

Biography #3 Guion S. Bluford, Jr. and Ronald McNair

Guion S. Bluford, Jr.

Guion S. Bluford, Jr. was born in Philadelphia on November 22, 1942. He was the first black American astronaut to be assigned a space mission. As a Lt. Col. in the United States Air Force, Bluford was assigned as a mission specialist on the third flight of the space shuttle Challenger, in August of 1983.

Bluford joined the Air Force after graduating from the aerospace engineering program at Pennsylvania State University in 1964. He saw extensive combat service in Vietnam. In 1978 he earned a doctorate in aerospace engineering from the Air Force Institute of Technology and in the same year became and astronaut.

Bluford is the first African American to have flown in space.

Ronald McNair

Physicist and astronaut Ronald McNair was born in Lake City, S.C. in 1950. He was one of the seven crew members who died in the space shuttle Challenger explosion in January, 1986.

McNair was born and raised in S.C. He said that picking cotton there helped him, "learn to endure." McNair attended North Carolina A&T University in Greensboro, earning his bachelor of science degree in 1971. He was admitted to the doctoral program in physics at the Massachusetts Institute of Technology and earned a Ford Foundation scholarship for graduate students.

After receiving his Ph.D. in 1976, McNair worked with laser physics at the Hughes Research Laboratories, now the Jet Propulsion Laboratories in Malibu, Ca. He was selected to the astronaut corps in January, 1978 and moved to Houston for training at the Johnson Space Center. On his first space shuttle mission in February, 1984, McNair orbited the earth 122 times aboard the Challenger. The fatal flight of 1986 was his second.

Biography #4 Walter E. Massey

Walter E. Massey

Walter Eugene Massey was born in Hattiesburg, Mississippi on Apr. 5, 1938. He is a black American physicist, educator, and administrator.

As a child, Massey enjoyed math and science. His research interest is in the physics theories. He once said that he saw physics as a way to use math to understand the world, and that was very exciting to him. Massey earned a Bachelor of Science degree at Morehouse College, Atlanta, Georgia in 1958, and a doctorate in physics from Washington University in St. Louis, Mo. in1966. He was a postdoctoral fellow and staff physicist at the U.S. Department of Energy's Argonne National Laboratory in Illinois from1966-68. There, his research in physics measured the energy of certain liquids and solids.

Massey taught physics at the University of Illinois from 1969-70 and at Brown University from 1970-79. He then became a full professor and college dean at Brown. At
Brown, Massey developed a program to train science teachers for inner-city schools. He returned to the Argonne National Laboratory in 1979 to become its director, while working as a professor of physics and vice president for

research at the University of Chicago. He developed a program to transfer new technologies from the laboratory and university to private industry. He was the first African American president of the American Association for the Advancement of Science, the world's largest science organization, and held that position from 1988 to 1989. In 1993, Massey became Provost and Director of Academic Affairs of the University of California.

Biography #5 Madame C. J. Walker

Madame C.J. Walker

Madame C.J. Walker was born Sarah Breedlove on Dec. 23, 1867. She was an African American inventor who became America's first Black female millionaire. She achieved her success by discovering a hair care process and marketing a line of cosmetics for black women.

Sarah was born in Louisiana. Her parents were ex-slaves who died when she was six. Raised by an older sister, she was married at 14 and a widow by 20. After her husband's death she moved with her young daughter to St. Louis. There, she took in laundry and went to night school to provide for her and her daughter. One day she invested a day's salary for the equipment to begin her experiments. In 1905 Sarah Breedlove discovered a formula that conditioned and softened curly hair. With the conditioner she invented and patented a straightening comb. Together the conditioner and comb were used to transform stubborn curls into smooth hair.

The next year she married newspaperman Charles Walker and they began organizing a sales force to distribute the products. By then her conditioner and comb products became known as the Walker Method. She opened offices in Denver and Philadelphia but soon moved to a central plant in Indianapolis. There, Walker products employed 3,000 people.

By 1919 Madame Walker established the Walker Schools of Beauty Culture across the United States. The standards set in her schools were later used as the guidelines for state cosmetology laws.

Besides her vision as an inventor and success as a business woman, Madame Walker was kind and generous. She sponsored many black artists and writers, contributed to the NAACP and awarded scholarships to students at Tuskegee and Palmer Institutes.

When Madame C.J. Walker died on May 25, 1919 her inventions and business were worth more than one million dollars.

Biography #6 Benjamin Banneker

Benjamin Banneker

Benjamin Banneker was born in Maryland in 1731 and became one of the most important American scientists in the 1700s. His father had been a slave but was freed before Benjamin's birth.

As a child, Banneker enjoyed math and science. As a student he attended a Quaker school for only a few years before leaving to study on his own.

His interest in astronomy grew when a neighbor gave him some books and a telescope. He began to study the stars and celestial bodies, and the impact they had on agriculture. As an astronomer he soon predicted a solar eclipse more accurately than other leading astronomers of his time.

Banneker also made the first clock in America by taking apart a watch, studying each part and then enlarging them. He then put the enlarged pieces in a wooden frame.

In 1790 Banneker was appointed to the District of Columbia Commission by President George Washington. The commission's job was to survey and design the nation's capital. When the chief engineer left with all the plans the project seemed doomed. Bannecker was able to reconstruct the plans entirely from memory.

Banneker returned to his lifelong love of astronomy and the star's effects on agriculture. From 1791 to 1802 he published annual almanacs that included the times of eclipses, sunrises and sunsets, tide tables, and phases of the moon. Unlike Benjamin Franklin's almanac, for which other people did most of the research, Banneker's almanacs were based entirely on his calculations.

Benjamin Banneker died in Baltimore Maryland at the age of 74.

Appendix D

Creative Study Skills Assessment

Name: _____ *Date*: _____

Read the question and the possible answers, then print the letter of the correct answer on the line next to the question.

1. _____	*George Washington Carver discovered many uses for these.*	a. b. c.	flowers peanuts carrots
2. _____	*George Washington Carver really wanted to be one of these before taking up horticulture.*	a. b. c.	an artist a farmer a cook
3. _____	*George Washington Carver taught at this famous Institute.*	a. b. c.	Marshall Argonne Tuskegee
4. _____	*Dr. Charles Richard Drew developed a method for preserving*	a. b. c.	blood plasma peanut butter hair conditioner
5. _____	*Dr. Charles Richard Drew studied to be a doctor in this country.*	a. b. c.	The U.S. Canada England
6. _____	*Dr. Charles Richard Drew was the first director of this.*	a. b. c.	American Red Cross Blood Bank NAACP American Science Institute
7. _____	*He was the first African American astronaut.*	a. b. c.	Benjamin Banneker Ronald McNair Guion Bluford
8. _____	*This African American astronaut died in the space shuttle Challenger explosion in 1986.*	a. b. c.	Ronald McNair Guion Bluford Walter Massey
9. _____	*On Ronald McNair's first space mission he orbited the earth this many times*	a. b. c.	10 100 122
10. _____	*Walter E. Massey is*	a. b. c.	an artist a physicist and educator an astronomer

11. _____	*Walter E. Massey's research is in this area.*	a. b. c.	energy in certain liquids and solids uses for peanuts laser research
12. _____	*Walter E. Massey developed a program at Brown College to train these people.*	a. b. c.	astronauts science teachers math teachers
13. _____	*Madame C.J. Walker was a female African American*	a. b. c.	inventor millionaire both a and b
14._____	*Madame C.J. Walker developed a method for doing this to hair.*	a. b. c.	straightening hair curling hair coloring hair
15. _____	*Madame C.J. Walker established the Walker Schools of*	a. b. c.	Science Beauty Business
16. _____	*Benjamin Banneker was famous for his study of*	a. b. c.	astronomy weather inventions
17. _____	*Benjamin Banneker invented the first one of these in America*	a. b. c.	clock watch telescope
18. _____	*Benjamin Banneker published these books which included times of sunrises and sunsets and tide tables*	a. b. c.	diaries encyclopedias almanacs

Circle "always," "sometimes" or "never" to complete the following statements

I was able to go to level	always	sometimes	never
I tried to go to level	always	sometimes	never

Circle "yes," "no" or "maybe" for the following statements

I feel that creative study skills helped me learn this information	yes	no	maybe
I feel creative study skills helped me taking this test	yes	no	maybe
I will use creative Study Skills for other subjects in the future	yes	no	maybe

Explain how Creative Study Skills worked for

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Appendix E

Table 2

Student results by question

Question number	Number of correct responses	Number of incorrect responses
1	42	1
2	40	3
3	37	6
4	42	1
5	27	16
6	42	1
7	15	28
8	21	22
9	17	26
10	28	15
11	28	15
12	36	7
13	25	18
14	31	12
15	42	1
16	28	15
17	40	3
18	33	10

Appendix F

Student Comment

The following responses were given to the open ended question, How did Creative Study Skills work for you?

1. "It was easy to remember things with the study skills. I remembered things from a long time ago."
2. "It helped me find the answers."
3. "It worked for me by putting the information there, in my brain."
4. "I am not sure I always got to level - my mind wanders. Sometimes I recalled very quick but other things I forgot completely."
5. "The three-fingers worked for me."
6. "It helped me to remember things about important people."
7. "It just helped me remember better."
8. "I tired it sometimes, but I don't think it worked for me."
9. "Well, before, I just couldn't remember a lick."
10. "It worked good for me."
11. "It helped me remember a lot. The three fingers worked real good."
12. "I think Creative Study Skills helped me remember information more accurately."
13. "It works for me."
14. "Creative Study Skills helped me prepare for the test."
15. "It clamed me down. It cleared my head to help me think more. One day I had a headache when we started but the relaxing took it away."
16. "I couldn't use it."
17. "It helped me remember facts about all the people we studied."
18. "I was able to understand and remember information that was given to me, better."
19. "It helped me feel better and learn more."
20. "It helped me a lot with knowing the answers to the test."

21. "The three-fingers helped me remember information."
22. "It helped me relax more when I study."
23. "I think it worked O.K. for me. On a 1-10 scale I'd give it a 6."
24. "It had to be really quiet for me to relax."
25. "It helped me think more clearly.
26. "I always tried it and I think it worked."
27. "The three fingers part helped me remember.
28. "I don't know how it worked but it did."
29. "It didn't help me."
30. "It worked good."
31. "It helped me get smarter and helped me get better learning skills. It helped me very well."
32. "It worked like a nap."
33. "It helped me learn a lot about famous people."
34. "I didn't even have to use the three fingers to get all the answers."
35. "I always tried and think it helped."
36. "Maybe it helped me some."
37. "I think it helped me learn more."
38. "I always tried, but couldn't do it."
39. "It helped me to pay attention and know more what to do."
40. "It helped me be patient and study about stuff."
41. "It helped me work harder and helped me think."
42. "It helped me."
43. "It helped me to study."